of antennæ subequal in length; pronotal longitudinal incisures somewhat narrow; femora not spined beneath.

Long, 21 mm.

Habitat.—Haut Mekong; Vien Poukha.

Allied to *V. melanopterus*, Stål.

Vilius conifacies, sp. n.

Head, pronotum, scutellum, connexivum, rostrum, body beneath and legs, reddish-ochraceous; antennæ (excluding basal joint), eyes, hemelytra, metasternum, abdominal segmental spots, viz. two at base, and one each on fourth, fifth and sixth segments, black; apices of femora, tibiæ and tarsi, piceous or black; basal joint of antennæ and an elongate, angulated, lateral, marginal spot to corium pale ochraceous; antennæ with the second joint longest; anterior femora finely, sparingly spined beneath; pronotal incisures punctate.

Long, 14 mm.

Habitat.—Laos, Vientiane.

Allied to *V. nigriventris*, Dist., but differing by the colour of the basal joint of the antennæ, the unspotted connexivum, the dark apices to the femora, etc.

CONTRIBUTIONS TO OUR KNOWLEDGE OF THE BRITISH BRACONIDÆ.

No. 4.—Rhogadidæ.

By G. T. Lyle, F.E.S.

(Continued from p. 136.)

Grandis, Giraud.

I am very pleased to add this fine species to our British list; it has hitherto been recorded from Austria, Hungary and Italy only. At once recognised by the hind tibiæ, which are black, with the basal sixth whitish. I have two males reared from New Forest larvæ of *Amphipyra pyramidea*, March 14th, 1912, and April 4th, 1913; both had remained within their cocoons for the previous nine months or so.

In "Species des Hyménoptères, etc.,"* the length of the insect is given as 7–10 mm. and the expanse as 12–16 mm.: my specimens measure 7 mm. in length and expand 14 mm. I may mention, however, that other cocoons, no doubt of this species, from which I have failed to rear the parasites are considerably larger than those from which my specimens emerged.

In constructing its cocoon the parasite larva does not utilise the whole of the skin of the host but only the five central

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* Vol. i of 'Braconidæ,' p. 276.

segments, the two anal segments and also the six following the head shrivelling up.

The segments containing the cocoon are somewhat distended, so that the indurated skin takes the form of a crescent. This construction is very firmly attached to a twig with the natural glue I have already mentioned. Unlike some of the species which weave nothing worthy of the name of cocoon within the hardened skin of the host, *grandis* constructs a distinct, though flimsy, pure white silken lining which is easily detached. In the New Forest this is certainly not an uncommon parasite of *Amphipyra pyramidea*; the host larva is killed when rather more than half grown, and my experience would seem to point to the later caterpillars only being attacked, though, of course, it is possible that parasitised larvæ feed up less rapidly than their more fortunate fellows.

Cruentus, Nees.*

A large, robust species with rufous thorax, the second discoidal cell only half as long as the first, and antennæ shorter than the body.

The only British specimen hitherto recorded was taken by Morley on the Norfolk Broads in August, 1911. A very fine female captured by Harwood near Colchester some few years ago and now in his collection has 57-jointed antennæ, and measures 9 mm. in length with an expanse of 15½ mm. The species is said to have been bred on the continent from *Dianthœcia cucubali*.

Rugulosus, Nees.†

Another fine species not hitherto recorded as British. It has the second cubital areolet subquadrate, and the third abdominal segment strongly punctate at the base and longitudinally striate towards the apex. In 1914 Col. C. G. Nurse sent me four reared by him between June 20th and 23rd of that year from Wicken larvæ of *Arsilonche albovenosa*. They were accompanied by their cocoons, by which it could be seen that the host larvæ had attained to something approaching half growth before succumbing. Only the central segments of the caterpillars had been made use of in constructing the cocoons, which greatly resemble in shape those of *R. grandis*. On the continent it is recorded as having been reared from *Acronycta euphorbiæ* and *A. abscondita*.

Prætor, Rein.‡

Probably the largest species we have and quite easy to identify. Bright testaceous, with only the antennæ (except extreme base of scape), eyes, stematicum, claws, hind tibiæ at apex, hind tarsi and a small spot above each radix, black. Radius of hind wing distinct, hind calcaria rather weak, approximately one third as long as the metatarsus. Antennæ with about 70 joints.

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* 'Mon. Aff.,' i, p. 212.

† 'Berl. Mag.,' v, p. 32, N. 49, and 'Mon. Aff.,' i, p. 209.

‡ 'Berl. Ent. Zeit.,' 1863, p. 260.

Reinhard described the species from a single female and the male appears to be still unknown.

The only British specimen hitherto recorded is a female bred by Morley from a small larva *Smerinthus populi* at Monks Soham, Suffolk. In my collection is a fine example of the same sex which measures 10 mm. in length and has an expansion of no less than 20 mm.; this specimen I owe to the generosity of B. S. Harwood, who captured it on a lighted shop window at Sudbury. The species is very possibly nocturnal, as are many other testaceous Hymenoptera. Harwood has still another female taken at Colchester some years ago.

Irregularis, Wesm.*

A smaller species having a length of 6–7 mm. only. It is at once recognised by the smooth and shining apex of the abdomen as well as by the flavous, black-tipped hind tibiæ. In the Cambridge University Museum are two ancient examples from the collection of the old Cambridge Philosophical Society; these are unfortunately damaged, one having lost its head and the other parts of both antennæ—the usual fate of pinned specimens. Harwood has a female taken many years ago at Colchester by his father, and no doubt that mentioned by Marshall ('Trans. Entom. Soc.,' 1885, p. 91). Morley gives numerous British localities.

Bicolor, Spin.†

Variable; very close to *tristis*, Wesm., the distinctions given by Marshall being somewhat obscure and principally differences of colour only. I have several times taken it in the New Forest, the earliest date being May 16th and the latest July 20th, and captured a male at Becton Bunny, Hants, on May 16th, 1910. All these have 41–44-jointed antennæ, which caused me for some time to doubt the correctness of my determination. Marshall gives the number of joints as 37–40.

Geniculator, Nees.‡

At first sight very similar to *gasterator*, Jurine, and *irregularis*, Wesm., but distinguished from those species by the short and feeble hind calcaria. My only example, a female, was bred on

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* 'Nouv. Mém. Ac. Brux.,' 1838, p. 101.

† 'Ins. Lig.,' ii, p. 128.

‡ 'Mag. Ges. Berl.,' 1811, p. 33.

September 1st, 1910, from a small larva of *Arctia villica* at Beer, Devon, in which county Bignell also reared several from *Odonestis potatoria*. On the continent it has been obtained from larvæ of *Arctia caja* and *Porthesia similis*. With so many common hosts it is strange that the species should be so rare with us. My specimen has the antennæ 47-jointed. Marshall gives the number as 48–52.

Modestus, Rein. *

Added to the British list by Marshall, who describes ('Brac. Europe, etc.,' vol. i, p. 294) how the species was reared in 1886 from cells of the solitary wasp, *Eumenes coarctata*, taken near Bournemouth, and concludes, no doubt correctly, that the parasites had preyed upon the caterpillars with which the wasps had stocked their cells. I have often found the store of *E. coarctata* to consist entirely of larvæ of heath-feeding species of the genus *Eupethecia*; it is therefore very possible that one or another of these was the host. In Marshall's collection in the British Museum there is only a single specimen without data; this insect, perhaps, scarcely agrees with Reinhard's description in one or two minor details, principally in the colour of the abdomen, which is decidedly more rufous. I have several insects, males and females, no doubt of the same species as Marshall's specimen; they were bred from larvæ of *Eupethecia nanata*, in late May and early June, 1915, given to me by Mr. G. B. Oliver. I have no note of the locality from which they came. All these examples have the second and third abdominal segments and the apex of the first dull rufous.

Nigricornis, Wesm.†

Easily mistaken for a dark form of *circumscriptus*, though differing therefrom in the shape of the first abdominal segment, which in *nigricornis* is much narrower at the base, and also in having longer antennæ. Apparently scarce; the only specimen I have is a female bred by Tonge from a nettle-feeding larva at Reigate, June 17th, 1911. In this example the antennæ are fuscous only at the apices.

Testaceus, Spin.‡

According to Reinhard, who was copied by Marshall, this is a species with 33–35-jointed antennæ and the second abdominal segment in the female "considerably broader than long." I have several insects which agree in every way with the original description of Spinola and also agree with Reinhard's and

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* 'Berl. Ent. Zeit.,' 1863.

† 'Nouv. Mém. Ac. Brux.,' 1838, p. 105.

‡ 'Ins. Lig.,' ii, p. 131.

Marshall's descriptions, excepting that the second abdominal segment in the female is quadrate, and the first in the male is rather longer than its apical breadth.

Three females bred in the New Forest in August from small sallow-feeding geometer larvæ, probably *Cabera exanthemata*, and also two males and three females reared from *Cilix spinula* (Cambridge), have antennæ 33–36-jointed. I am not inclined to think these are a form of *circumscriptus* and must echo Bridgman, who took a female in 1889 near Norwich, and, as mentioned by Morley, writes of it: "I believe it to be *testaceus*—I think it must be *testaceus*." Harwood has an insect in his collection bearing a label "*Rhogas testaceus*" in Bridgman's writing, and it is possible that this may be the identical specimen of which Bridgman writes; but, however that may be, it is certainly of the same species as the insects bred by me and mentioned above. Reinhard tells us that *testaceus* has been reared as a *gregarious* parasite from large larvæ of *Cerura vinula* and *C. bifida*, and it is also recorded as bred on the continent as a solitary parasite from such hosts as *Cilix spinula* and *Eupethecia sobrinata;* this rather points to confusion, and I imagine that should the gregarious broad-bodied parasite of the puss moths ever be rediscovered it may be necessary to separate it from the *testaceus* of Spinola and Nees.

Cantherius, sp. nov.

Male.—Black, with only occasionally a faint suggestion of a paler spot on the disc of the second abdominal segment.

Female.—Black, with the first abdominal segment marked with a flavo-testaceous chevron, the point of which rests on the centre of the apex of the segment; second segment with a large central flavo-testaceous spot on the disc, also, occasionally, a small pale basal spot on the third segment, and the apex of that and the two following segments more or less testaceous.

Both sexes have the vertex, frons, face and orbits rufofuscous (sometimes almost black), with the clypeus, mandibles and palpi testaceous. Belly fuscous (rather lighter in the female), prosternum, mesosternum and mesopleuræ rufofuscous, the last distinctly longitudinally paler where adjoining the mesosternum. Legs testaceous with the hind coxæ alone fuscous, hind tibiæ apically and all the tarsi darker. Antennæ dark, with scape, and flagellum basally beneath, testaceous, about as long as the body, 40–42-jointed. Mesopleuræ slightly granulated, rugose under wings, metathorax and abdomen pubescent. Mesothorax, scutellum and metathorax granulated, the last with a distinct central longitudinal carina.

Abdomen of male elongate, of female somewhat shorter; first segment half as long again as its apical breadth, second slightly longer than broad in the male, quadrate in the female, third broader than long; first, second and base of third rugulose. The remainder smooth, first and second carinated. Terebra very slightly exserted.

Wings hyaline; stigma fuscous with the inner angle pale; nervures fuscous; radius after the first abscissa and central abscissa of cubitus decolorous; second cubital areolet somewhat narrowed externally, not longer than second discoidal; second abscissa of radius one-third or one-fourth longer than first transverse cubital nervure. Radius of hind wing obsolete. Hind calcaria feeble, less than one-third as long as the metatarsus.

Length, 4½–5 mm.; expands 8½–9 mm.

Described from three males and four females. It will be noticed that this description is very similar to that of *modestus*, Rein.—indeed for some time I considered my specimens should be referred to that species, but after breeding a considerable number I am convinced they are distinct: *Modestus* has the pale portions of the body rufotestaceous, not flavotestaceous, the stigma testaceous, not fuscous, the mesopleuræ smooth and shining and the antennæ longer; it is also of larger size. All the females I have seen have the chevrons on the first abdominal segment very well marked and most noticeable, though in a genus where the extent of the pale marking on the abdomen varies so much, it is more than likely that examples will be found in which this prominent distinguishing mark is almost, if not quite, absent.

In the New Forest this is a fairly abundant parasite of *Semiothisa liturata* and I have bred it at various dates between March 18th and May 11th, all the insects having passed a winter within the hardened skins of their hosts, which are firmly attached to a pine needle. All the host larvæ were beaten from Douglas fir simultaneously with numbers of the larvæ of *Thera variata* (*obliscata*), but from none of the latter have I ever obtained the *Rhogas*. It is difficult to find a reason for this, the larvæ of the two moths being so similar in size, habits and appearance.

Harwood obtained a female by beating firs at Beirchurch Park, Essex, June 25th, 1914.

Circumscriptus, Nees.*

Undoubtedly our commonest species; a frequent parasite of young larvæ of *Noctuæ*. Distinguished by the number of joints of the antennæ being less than in any other British species, excepting *testaceus*; in my many typical specimens they number from 37–41. Reinhard describes seven colour varieties, of which the first (body and legs testaceous excepting the metathorax and first abdominal segment, *Aleoides nigriceps*, Wesm.†) appears to be the most plentiful. Very considerable variation is also noticeable in size, the usual length being 4½–5 mm. and expanse 8–9 mm., though I have a fine female measuring 6 mm. in length and expanding fully 11 mm.

In the New Forest I have reared the species from larvæ of

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* 'Mon. Aff.,' i, p. 216.

† 'Nouv. Mém. Ac. Brux.,' 1838, p. 109.

Triphœna fimbria, April 29th, 1909, *T. pronuba*, December 1st, 1913, *Calymnia trapezina*, June 22nd, 1911, *Tæniocampa stabilis*, June 30th and July 12th, 1915, *Noctua xanthographa*, April, 1911, and also from undetermined larvæ of Noctuæ on apple July 7th, 1911, on broom April 23rd, 1914, and on *Harpalium rigidum*, July 30th, 1914. Beaten from oak September 17th, 1916, and October 10th, 1916. Swept at Becton Bunny, Hants, May 16th, 1910, Hunstanton Sand Hills, Norfolk, June 5th, 1918, and Cambridge, August 1st, 1918. No doubt the insect is common throughout the country. Marshall and Morley give numerous localities.

Armatus, Wesm.*

Somewhat similar to the last, but having larger eyes and the vertex behind them with straight sides. Often entirely testaceous with the exception of the eyes, stemmaticum, claws, terebra and a small dot over each radix which are black. The male is very like that of *Petalodes unicolor*, though, of course, easily separated therefrom by the suturiform articulation.

I have one male and two females bred from New Forest larvæ of *Ephyra linearia*. September 30th, 1912, April 28th, 1915, and June 6th, 1916 ; the two last passed a winter within the hardened skins of their hosts. Male antennæ 42-jointed, of both females 39-jointed.

(To be continued.)

NOTES ON ODONATA COLLECTED IN NORTH WALES IN JUNE AND JULY, 1918.

By A. H. Newton, M.B., Ch.B.

On June 4th I found several small pools near the summit of Conway Mt. literally swarming with *Libellula quadrimaculata*, Linn. These pools were small and shallow with grassy bottoms, and with no reeds or herbage other than the short mountain grass at the edge of the water. The insects were difficult to catch—not because they appeared to avoid one, but because of their sober colouring and the quickness of their flight. They seemed to live their lives at high tension. After a time I found that by listening for the flutter of wings as they came together *in copula* I could frequently follow and catch a pair of them.

Very little time is spent *per collum*. It seemed to me, however, that there was something unusual about the attitude when in this position, and after watching carefully I came to the conclusion that the male passes his claspers below the mouth of the female and grips her neck from the ventral aspect. It even seemed that at the first moment of contact the female was

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* 'Nouv. Mém. Ac. Brux.,' 1838, p. 112.